University of Illinois Chicago Library

Title: Developing and testing assessment tools for measuring library impact on student academic success

Abstract

The University of Illinois Chicago (UIC) Library, in partnership with Northern Illinois University (NIU) Libraries, is requesting $257,656 for a two-year Institute of Museum and Library Services (IMLS) National Leadership Grant - Applied Research funding category and the Champion Lifelong Learning goal category, Objective 1.1. In response to the limitations of learning analytics, this research project aims to address this gap by developing the assessment tools that utilize information and data beyond learning analytics, such as academic engagement, psychological factors, and students' definitions of academic success, to demonstrate the impact of the library on students' academic success from the learners' perspective of academic success. Through engagement with undergraduate students at two academic institutions serving underrepresented minority and first-generation students, this project will test and validate the developed assessment tools. This project is unique in that it will highlight activities that students' report contributed to their success based on a definition of success provided by the students, rather than standardized outcomes, such as Grade Point Average (GPA). This will not only allow the library to better articulate their role in student success but also to identify specific activities that can be promoted to diverse groups of students to further support their academic success. The tools will be made available for dissemination to academic libraries who may not have capacity or policies to utilize learning analytics or for academic libraries who wish to supplement or replace their use of learning analytics, to assess the impact of their library on student success and to further support and address students' needs and/or academic libraries.

Project Justification

Demonstrating the library's value on students' academic success has become more prevalent since the publishing of the Association of College and Research Libraries (ACRL)' *The Value of Academic Libraries Report* in 2010[1]. To understand and measure students' learning outcomes, more academic libraries are adopting learning analytics by utilizing student learning data from the institutional administrative level. Learning analytics is "the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs[2]". In the case of academic libraries, learning analytics may for example, explore data points such as Grade Point Average (GPA) and course completion in relation to academic engagement (e.g., attending workshops at writing center and career center, and database /catalog logins or entry into the library[3]. However, several issues and concerns have been raised in the use of learning analytics. At the institutional level there are concerns that policies may be limited in addressing who, how and when students' data may be used. Concerns have also been expressed regarding: how data are protected, how does the data system ensure students' privacy, where is the data stored, and who owns it?[4] It is also advised that prior to implementing learning analytics, libraries should explore both benefits and potential drawbacks of learning analytics based on librarians' knowledge, intent, and practices[5]. Given that not all academic libraries have an institutional system or policies in the use of learning analytics, there are concerns how academic libraries without the capacity to access and integrate data or without data privacy policies will be able to measure and demonstrate the library's value on students' academic success. While learning analytics have merits to "discover, diagnose, and predict challenges to learning and learner success[6]," learning analytics also have limitations in

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[1] Oakleaf, M. (2010). The value of academic libraries: A comprehensive research review and report. Chicago, IL: Association of College and Research Libraries. https://www.ala.org/acrl/sites/ala.org.acrl/files/content/issues/value/val_report.pdf

[2] George Siemens. (2012), "Learning Analytics: Envisioning a Research Discipline and a Domain of Practice," in Proceedings of the 2nd International Conference on Learning Analytics and Knowledge (New York, NY: ACM). https://doi.org/10.1145/2330601.2330605.

[3] Croxton, R. A., & Moore, A. C. (2020). Quantifying library engagement: Aligning library, institutional, and student success data. *College and Research Libraries*, *81*(3), 399–434. https://doi.org/10.5860/crl.81.3.399

[4] Jones, K. M., Briney, K. A., Goben, A., Salo, D., Asher, A., & Perry, M. R. (2020). A comprehensive primer to library learning analytics practices, initiatives, and privacy issues. *College & Research Libraries*, *81*(3), 570-591.

[5] Oakleaf, M (LIILA, Nov. 15, 2018). Library Integration in Institutional Learning Analytics, available online at https://library.educause.edu/~/media/files/library/2018/11/liila.pdf

[6] Oakleaf, M (LIILA, Nov. 15, 2018). Library Integration in Institutional Learning Analytics, available online at https://library.educause.edu/~/media/files/library/2018/11/liila.pdf

claiming library interactions have a positive impact on students' academic success based on the collection of aggregated quantifying data (e.g., tracking students' use of services and resources and its link with their GPA and retention rate), as the correlations do not prove causation.[7] Most importantly, learning analytics cannot account for factors affecting learners' academic engagement.

Since 2016, the UIC Library has been conducting ongoing assessments utilizing learning analytics to understand users' needs and examine the relationships between library use and students' academic success (GPA) by using locally developed and validated surveys.[8, 9, 10] However, the findings revealed that the frequency of students' in-person library use was negatively correlated with students' GPA.[11, 12] While we speculate that students with lower GPAs are likely to spend more time in the library, it is unknown the specific activities they engage in while in the library. Furthermore, this correlation does not reveal the relationship between the impact of library use and any potential change in their GPA. Further investigation was necessary to determine underlying factors. While GPA is widely used as an indicator of academic success[13], its use can be of limited value because it may not capture attaining learning objectives and acquiring desired skills and competencies[14] and it can imply that academic success is limited to getting the highest values on the scale. The host institution conducted interviews to explore how and why students utilized the libraries, how they defined academic success, and whether the library impacted their learning outcomes using a mixed-method approach. The qualitative findings uncovered that students' perceptions of academic success are not only about getting a higher GPA but also about developing applicable skills, accomplishing the learning process, and obtaining subject knowledge[15]. The qualitative findings further revealed that most of the students perceived that their use of the library positively influenced their GPA. However, the quantitative findings indicated that their actual frequency of library use was not associated with their reported GPA. Continuing the assessment initiated by the host institution is critical to exploring ways to demonstrate the library's value on students' academic success. In addition, gaps remain in our assessment tools that when identified, would more clearly illustrate academic engagement activities that increases student success, and other causal factors that inhibit or promote success. In addition, the ability to generalize the findings to other academic libraries is currently unknown.

The literature in education and psychology has shown that students' motivation and self-regulation are important psychological concepts, and they are associated with students' academic engagement and academic achievement.[16,17] However, few studies in the library and information science literature have examined how students' psychological factors (e.g., self-regulation and motivation) impact students' academic engagement, and later their academic achievement. Identifying psychological factors that influence students' academic engagements, including library use, and measuring its

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[7] Robertshaw, M.B. and Asher, A. (2019), Unethical numbers? A meta-analysis of library learning analytics studies, *Library Trends*, 68 (1), 76-101, https://doi: 10.1353/lib.2019.0031.

[8] Scoulas, J. M., & De Groote, S. L. (2019). The library's impact on university students' academic success and learning. *Evidence Based Library and Information Practice*, *14*(3), 2–27. https://doi.org/10.18438/eblip29547

[9] Scoulas, J. M., & De Groote, S. L. (2020). University students' changing library needs and use: a comparison of 2016 and 2018 student surveys. *Evidence Based Library and Information Practice*, *15*(1), 59–89. https://doi.org/10.18438/eblip29621

[10] Scoulas, J. M., Aksu Dunya, B., & De Groote, S. L. (2021). Validating students' library experience survey using rasch model. *Library and Information Science Research*, *43*(1), 101071. https://doi.org/10.1016/j.lisr.2021.101071

[11] Scoulas, J. M., & De Groote, S. L. (2019). The library's impact on university students' academic success and learning. *Evidence Based Library and Information Practice*, *14*(3), 2–27. https://doi.org/10.18438/eblip29547

[12] Scoulas, J. M., & De Groote, S. L. (2021). University students' library experience and its impact on their GPA during the pandemic. *Journal of Library Administration*, *61*(7), 813–837. https://doi.org/10.1080/01930826.2021.1972730

[13] Soria, K. M., Fransen, J., & Nackerud, S. (2013). Library use and undergraduate student outcomes: New evidence for students' retention and academic success. portal: Libraries and the Academy, 13(2), 147-164. https://doi.org/10.1353/pla.2013.0010

[14] York, T. T., Gibson, C., & Rankin, S. (2015). Defining and measuring academic success. *Practical Assessment, Research and Evaluation*, *20*(5), 1–20.

[15] Scoulas, J.M., & De Groote, S. L. (Accepted for May 2022 issue). Impact of Undergraduate Students' Library Use on their Learning beyond GPA: Mixed-Methods Approach. *College & Research Libraries*

[16] Ketonen, E. E., Haarala-Muhonen, A., Hirsto, L., Hänninen, J. J., Wähälä, K., & Lonka, K. (2016). Am I in the right place? Academic engagement and study success during the first years at university. *Learning and Individual Differences*, *51*, 141–148. https://doi.org/10.1016/j.lindif.2016.08.017

[17] Lichtinger, & Kaplan, A. (2011). Purpose of engagement in academic self-regulation. New Directions for Teaching and Learning, 2011(126), 9–19. https://doi.org/10.1002/tl.440

impact on their own definition of academic success are vital to understanding the causal relationship of students' learning behaviors and their outcomes. While the definitions of academic engagement vary in the existing literature of the educational contexts, it is typically described as a multidimensional construct containing emotional, cognitive, and behavioral aspects.[18] In the current research project, academic engagement focuses on behavioral aspects of engagement, such as visiting a writing center for support, studying in the library, using print library resources, or using online library resources (remotely or in the library). The instruments to be developed through this project will prompt for academic engagement activities, as well as prompt for time engaged on a task. These aspects will allow the capture of observable behaviors of college students. For these reasons, questions that contain psychological elements (motivation and self-regulation), academic engagement including library use, and students' own definition of academic success will be used to investigate the underlying causal relationships. The reliability and validity of the instruments will be tested at both institutions.

This project will address the following research questions:
1) How does student demographics (e.g., Pell-grant eligible, first-generation status, underrepresented minority status, and program discipline) play a role in how students engage in academic activities, including their use of the library?
2) How do students' psychological factors (motivation and self-regulation) relate to their academic engagement?
3) How do students define their academic success and how do students view the library's contribution to this success?
4) What factors (demographics, psychological factors-motivation and self-regulation, academic engagement) correlate with students' GPA and students' own definition of academic success?
5) How can libraries utilize the assessment tools to examine academic engagement and success and apply the findings?

Project Design

This research project aims to fill the gaps identified above by developing assessment tools that will be designed from the learners' perspective of academic success. This is a two-year research project. During year one, the research project team at both UIC and NIU will develop the assessment tools and test/validate the tools initially with content experts. Next, the assessment tools will be deployed at UIC to undergraduate students for pilot-testing, and modified further based on survey responses. The assessment tools will be designed to explore types and frequency of undergraduate students' academic activities in their institution and explore these in relation to students' motivations for academic engagement and self-regulation, their own definition of academic success, and GPA. During year two, the assessment tools will be deployed at both UIC and NIU to further validate the tools and for large-scale data collection and comparative analysis to address this projects' research questions. Research findings and assessment tools will be disseminated via various channels such as conferences and publications and publicly available to any academic libraries who want to use the tools.

The main goals of this project are to:
1) Develop assessment tools that examine the academic engagement (e.g., utilizing writing center, using print or online library resources, studying in the library) and their psychological factors (e.g., motivation and self-regulation) of students from diverse backgrounds in relation to their own definition of academic success and their GPA, and to identify potential causational relationships with students' academic success
2) Test and validate the assessment tools and
3) Disseminate the developed assessment tools to academic libraries who want to use them to investigate and demonstrate the library's value and impact on students' academic success, and to apply the findings to better support all types of students' learning.

This project is aligned with the NLG: Goal 1: Build the workforce and institutional capacity for managing the national information infrastructure and serving the information and education needs of the public and Objective 1.1: "develop or

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[18] Appleton, J. J., Christenson, S. L., Kim, D., & Reschly, A. L. (2006). Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument. *Journal of School Psychology*, *44*(5), 427–445. https://doi.org/10.1016/j.jsp.2006.04.002

enhance replicable library and archives programs, models and tools that provide opportunities to support all types of learning." In addition to developing and validating assessment tools to more directly assert the impact of the academic library based on students' own definition of success, it will highlight activities that students' report contributed to their success based on success as provided by the students rather than placing the focus of success on only standardized outcomes, such as GPA. This will not only allow the library to better articulate the role of the library in student success, but specific activities can be promoted to diverse groups of students to further support their academic success.

The primary outcomes of this project are to:

1) research potential causations between students' academic engagement and their academic success to expand the existing literature. This will support academic libraries in advancing their understanding of why or why not students participate or don't participate in academic engagement and further determine what factors predict students' definition of academic success. This information can be applied to encourage students' academic engagement to further support or improve their academic success.

2) validated assessment tools for academic libraries that measure students' academic engagement including library use, and psychological factors that are associated with students' academic success, in relation to students' own definitions of academic success. The validated assessment tools will be designed so their use can be implemented and replicated at other academic libraries who want to support all types of students' learning and use the findings to develop their own programming and curricula for students' academic success.

Research sites

The two study institutions will be the University of Illinois, Chicago (UIC) and Northern Illinois University (NIU). UIC is a public research university in Chicago with more than 33,000 students consisting of 65% undergraduate students. There are no racial or ethnic majorities at UIC. For both undergraduates and graduates at UIC, 31% are White, 26% are Hispanic or Latino, 18% are Asian, 8% are Black or African American, 3% are two or more races, 0.07% are American Indian or Alaska Native, and 0.04% Native Hawaiian or Other Pacific Islanders. NIU is a suburban public research university in DeKalb, Illinois with approximately 17,000 students consisting of 73% undergraduate students. At NIU, 54% of students are white, 18% are Hispanic or Latino, 14.6% are Black or African American, 5.5% are Asian, 3% are two or more races, 0.1% American Indian or Alaska Native, and 0.07% Native Hawaiian or Other Pacific Islanders. Both universities have similar undergraduate student characteristics; both are racially diverse and minority serving with high proportions of Pell-grant eligible and first-generation students. Examining diverse undergraduate student populations is critical because the findings will allow researchers to better understand all types of students' learning, expand the existing literature, and develop programs that serve all types of students. Also, the findings will guide the researchers to generate well-developed assessment tools for other academic libraries that serve not only traditional students but also non-traditional students. Given this, NIU is an ideal peer institution for comparisons and testing of the assessment tools.

Project Team

The research project team includes Project Director (PD) Jung Mi Scoulas and three Co-Principal Investigators (Co-PIs).

- Jung Mi Scoulas (Principal Investigator and Project Director). Dr. Scoulas is an Assistant Professor and Assessment Coordinator at UIC Library, holding a PhD in educational psychology with expertise in library assessment, research design, survey design, and student learning. Her primary research includes examining the impact of students' and faculty's library experiences on their academic success and research productivity, and she has presented and published widely at the national and international level. She is currently serving as vice chair of the ACRL Value of Academic Libraries Committee, which leads the national conversation, practices, and implementations about the effectiveness of the Value initiatives. Jung Mi is also playing a critical role as the Research Scholar at the Association of Research Libraries (ARL) Diversity, Equity, and Inclusion (DEI) Institute Task Force to provide deep expertise in qualitative and quantitative research methodologies related to curriculum, evaluation, outcomes, and impact.

- Sandra L. De Groote (Co-Principal Investigator). Professor De Groote is the Head of the Assessment and Scholarly Communications at UIC Library with expertise in assessment, the impact of online information systems and scholarly metrics. Her more recent research has focused on the impact of the library on student success and faculty productivity.
- Nestor Osorio (Co-Principal Investigator). Professor Osorio is the Head of the Reference and Research at the NIU with experience in higher education assessment, data analysis and visualization, and has co-chaired two assessment plans and status reports for NIU Libraries.
- Kimberly Shotick (Co-Principal Investigator). Professor Shotick is the Student Success Librarian at NIU with expertise in undergraduate student success.

Project Workplans

This grant project will be carried out over two years: Year one will focus on developing, pilot-testing, and revising assessment tools at UIC in collaboration with NIU. Year two will involve testing the revised assessment tools at both UIC and NIU, analyzing the findings and disseminating findings and the assessment tools.

Year one: Develop assessment tools and pilot-test them at the host institution.

Develop assessment tools: The Project Director (PD) and Co-Principal Investigator (Co-PIs) at UIC and NIU will develop a Student Academic Engagement and Success Survey (hereafter referred to as Student Success Survey) and an Online Weekly Journal for students to record their academic activity. An online survey instrument will be developed to capture undergraduate demographics (e.g., class level, programs, gender, race/ethnicity, first generation status, Pell Grant status, GPA), their motivation for academic engagement, self-regulation, study skills, academic engagement time, the physical locations for academic engagement, and their own definition of academic success. Content captured through the Student Success Survey will inform the Online Weekly Journal content. An Online Weekly Journal will be created to capture students' weekly academic engagement containing frequency of students' academic engagement, their motivations of academic engagement, reflections of their weekly academic engagement, internal (e.g., hard to concentrate on their academic studies) and external (e.g., paid-work on or off campus, family responsibilities) factors that affected their academic engagement, and demographics. It will also include a section for setting their own academic goals at the beginning and end of the journaling, and self-evaluating of their academic goals. Both the Student Success Survey and the Online Weekly Journal will be set up on the online survey platform, Qualtrics.

Test face validity (expert assessment) of the tools: The criteria for testing the assessment tools will be created at the beginning of this stage. Ten content experts including librarians, educational psychologists, and practitioners will be recruited and invited to rate the content validity of the initial assessment tools (survey and online weekly journal) in terms of relevance and clarity as well as psychological constructs. Validating the tools is critical to ensure that the assessment tools are measuring what they are supposed to measure prior to dissemination. Also, testing the assessment tools containing psychological constructs (self-regulation and student motivation) for academic engagement with content experts will strengthen the reliability of the findings and enable other libraries to adapt and replicate the findings. Content experts will be recruited from both UIC and NIU including the UIC and NIU Libraries and the UIC and NIU Educational Psychology department. Referrals from UIC and NIU experts will be obtained if needed. Content experts will be asked to evaluate the assessment tools guided by the criteria that the research project team provide.

Prepare and obtain Institutional Review Board (IRB) approval for the research project: Once content experts validate the tools, the PD and all Co-PIs will prepare and submit the IRB materials for approval per UIC and NIU's guidelines. IRB materials include the IRB application form, participants' informed consent notice, research protocol, recruitment message, and the assessment tools (survey and online weekly form).

Recruit and distribute the survey: All UIC undergraduate students who are age 18 or older are eligible to participate in the Student Success Survey. Given that year one is the pilot phase at UIC, students will not be recruited through direct emailing to participate in the survey. The survey will be disseminated via various social media platforms (Twitter and Instagram), the UIC website and news, flyers, and undergraduate students' organizations listservs. (e.g., Undergraduate Student Government). A graduate student worker, who will provide administrative assistance for the next stages, will be

recruited and hired during the survey distribution stage. To promote the research project and increase the survey response rates, students who complete the Student Success Survey will be asked to enter their contact information into a survey lottery to win a $100 e-gift card. A total of 10 survey lottery winners will be randomly selected at UIC, and each lottery winner will receive $100 e-gift card.

Analyze the Survey data: The PD and UIC Co-PI will analyze the data from Student Success Survey guided by the research questions. Proposed data analysis is displayed in Table 1. Open-ended responses from the survey will be analyzed and reviewed by all project team members. The PD will provide direction to the research team on how to analyze the qualitative data, to maintain the consistency of the qualitative data analysis. Findings from the survey will be used to identify potential additions to the Online Weekly Journal.

Recruit and distribute Online Weekly Journal: A separate recruitment survey will be created and distributed through social media to recruit participants to participate in the Online Weekly Journal activity. The recruitment survey will prompt for students' demographics such as class level, discipline and race/ethnicity, and their academic engagement. The graduate student will invite the potential Online Weekly Journaling participants based on their academic engagement (or lack of) and discipline (humanities, sciences, social sciences, and health sciences) to ensure a cross section of student diversity. Information about the incentive will be provided during recruitment. A total of 100 students will be selected and asked to journal once a week for 8 weeks, providing information on their frequency of library use and academic engagement across campus. The online journal will consist of closed-ended questions to capture frequencies, lengths, and locations of their academic engagement (see Figure 1 as a sample of Online Weekly Journal). Students will be provided with examples of academic engagement as part of the instructions provided at the start of the journal process. In addition, the online journal will provide a potential list of academic engagement activities that students can select, as well as provide open ended slots to capture additional academic activities. At the beginning and at the end of the 8-week journaling period, students will also be asked to reflect upon their academic engagement, their own definition of academic success, and identify their own academic goals. The graduate student will monitor participants weekly submission adherence for the Online Weekly Journal activity and send email reminders to increase compliance during the 8-week period. Each student who completes the Online Weekly Journaling activity will be compensated with an $80 e-gift card at the completion of the 8-week period. Once the recruitment and compensation are completed, students' emails and names will be destroyed. To ensure students' privacy, full details are provided in the data management plan.

Figure 1. Sample of Online Weekly Journal

Analyze Online Weekly Journal data and modify the assessment tools: The PD and UIC Co-PI will analyze the quantitative data from the Online Weekly Journal, and all project team members will analyze the qualitative data. The PD will provide direction to the research team on how to analyze the qualitative data, to maintain the consistency of the qualitative data analysis. All project team members will draft the report for IMLS by synthesizing the findings from the survey. All project team members will review the report and incorporate their feedback into the report. The proposed data analysis based on the research questions are displayed in Table 1. Additionally, the project team will review the procedures of the recruitment and assessment tools and modify the tools if needed.

The outcomes of year one will be two assessment tools (survey and online journal) that have been validated by content experts and revised as appropriate, initial research findings, and a report. The survey research findings will provide an analysis of the overall patterns of undergraduate students' academic engagement, relationships between academic engagement and psychological factors (self-regulation and motivation), and its impact on their academic success (GPA). The research findings of Online Weekly Journal will explore more in-depth how often undergraduate students are engaged with academic activities, factors influencing their academic engagement, and how these factors contribute their academic

success, based on their own definition of academic success and their perceptions of evaluating their academic goals. The two assessment tools will be ready for additional use and external validation at both UIC and NIU in year two.

Table 1. Research questions and proposed data analysis

	Research questions	Assessment tools	Proposed data analysis
Year one: Pilot study at UIC	• How does student diversity (e.g., Pell-grant eligible, first-generation status, underrepresented minority status, and program discipline) play a role in how students engage in academic activities including their use of the library?	SSS[a] and OWJ[b]	Descriptive statistics
	• How do students' psychological factors (motivation and self-regulation) relate to their academic engagement?	SSS	Chi square test (types of academic engagement) Pearson correlations (level of academic engagement)
	• What factors (demographics, psychological factors-motivation and self-regulation, academic engagement) have significantly impact on their GPA?	SSS	Multiple regression
	• How do students define academic success?	SSS and OWJ	Thematic analysis from AESSS (open-ended responses) and Thematic analysis (open-ended responses) from OWJ
	• How do their academic engagement correlate to these definitions?	OWJ	Chi square test
Year two[c]: UIC and NIU	• Are there the differences of academic engagement, psychological factors and definition of academic success between UIC and NIU?	SSS and OWJ	Descriptive statistics; Independent sample t-test

[a] SSS: Student Success Survey; [b] OWJ: Online Weekly Journal; [c] Data analysis during year two will remain the same as year one with the addition of comparisons between both institutions.

Year two: Test the revised assessment tools at both institutions.

Prepare and obtain IRB approval from UIC and NIU: Each institution will submit amendments to address changes made to the assessment tools during year one, and obtain any additional IRB approval necessary to continue with the next phase of the project.

Project planning meeting: To maintain the consistency of the recruitment and data collection at both UIC and NIU and to ensure the survey participants are representative of UIC and NIU based on students' demographics (e.g., class level, programs, GPA, and race/ethnicity) and academic engagement, the PD and UIC Co-PI will provide written instructions on the steps and strategies on recruitment plans and data collection and have meetings with NIU Co-PIs prior to distributing the assessment tools. The Student Success Survey and the Online Weekly Journal will be managed with UIC's Qualtrics subscription and shared with Co-PIs at NIU to test and confirm the online assessment tools are working and participant responses are accessible to the team.

Recruit and distribute the survey to both UIC and NIU: Each institution will distribute the survey during the same period at their own institution. All undergraduate students will be recruited directly through their institutional email address during year two, reaching out to all undergraduate students at UIC and NIU. The project team at each institution will obtain the students contact information from their institutional research office. Their email addresses will be imported into Qualtrics and used to distribute the survey to all undergraduate students at UIC and NIU. The target response rate is 10%

(UIC: 2,100 respondents and NIU:1,700 respondents). To promote the research project and increase the survey response rates, a lottery of incentives will be offered to students who complete the Student Success Survey and entered their contact information for the survey lottery. A total of 10 survey lottery winners will be randomly selected at each institution, and each lottery winner will receive a $100 e-gift card.

Analyze the Student Success Survey: The PD and UIC Co-PI will analyze the quantitative data collected from the Student Success Survey from both institutions. Data analysis during year two will remain the same as year one, with the addition of comparisons between both institutions (Table 1). Open-ended responses from the survey will be analyzed by all project team members. The PD will provide direction to the research team on how to analyze the qualitative data, to maintain the consistency of the qualitative data analysis. The findings from the survey will also be used to identify potential additions to the Online Weekly Journal.

Recruit and distribute Online Weekly Journal: The PD and Co-PIs at each institution will distribute a survey to recruit participants for the Online Weekly Journal. Compensation for students who participate in the Online Weekly Journal will be offered and promoted to increase recruitment of potential volunteers. During this stage, potential student participants for the Online Weekly Journal will be screened and selected from a cross section of student demographics to ensure a diversity of students is selected, using criteria that was used during year one. A graduate student will monitor their compliance for an 8-week period and send regular email reminders to participants at both UIC and NIU. Students at both institutions who complete the Online Weekly Journaling activity will be compensated with an $80 e-gift card at the completion of the 8-week period. All responses from the Success Survey and the Online Weekly Journal will be collected and stored in UIC's Box, and all members of the project team will have access the data. Once the recruitment and compensation are completed, students' emails and names will be destroyed. To ensure students' privacy, full details are provided in data management plan.

Analyze the Online Weekly Journal data and write reports: The PD and UIC Co-PI will analyze the quantitative data collected from Online Weekly Journal, and all project team members will analyze open-ended responses. Data analysis methods per each research question will remain the same as the year one with the addition of comparisons between both institutions (Table 1). The PD will provide direction to the research team on how to analyze the qualitative data, to maintain the consistency of the qualitative data analysis. The survey findings will be compared within UIC (year one and year two at UIC) as well as UIC with NIU (year two) to examine the similarities and differences within and between the two institutions in students' academic engagement, self-regulation and motivation. All project team members will collaborate to write the final report for IMLS. All project team members will review the procedures of the recruitment and assessment tools and modify the tools as necessary prior to making the data publicly available.

Deidentify data and deposit in UIC and NIU repository: All data intended for sharing will be deidentified. The deidentified data from UIC and NIU, and the assessment tools (Student Success Survey, recruitment survey for Online Weekly Journal, and Online Weekly Journal) will be deposited in the UIC and NIU repositories.[19]

Disseminate findings and assessment tools: All project team members will contribute to presenting the research findings through various channels, such as conferences and publications. In addition, the project team will host their own series of webinars introducing the assessment tools and steps on how to use the assessment tools. The webinar series will be promoted through various library association listservs and forums (e.g., ACRL Online Discussion Forums and ACRL Presents). The PD and UIC's Co-PI will additionally provide virtual workshops for up to five academic libraries who want to learn about the developed assessment tools. Five academic libraries will be selected based on the institutional characteristics (College and University Library, Community College Library, Vocational and Technical College Library, and for-Profit College Library). These workshops will represent each type of academic library and enhance the applications of the assessment tools. The project team will also create the Student Success Assessment Toolkit to make available long term the results of this project, for those that want to conduct their own analysis of student engagement and student learning. The Student Success Assessment Toolkit will contain documentation and instructional videos on the purpose and audience of the assessment tools, how to use and disseminate the assessment tools (procedures on IRB approval, recruitment, data collection, data analysis, communicating the findings to stakeholders, and ways to

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[19] University of Illinois Chicago Library (n.d.). *Discover research from University of Illinois Chicago*. https://indigo.uic.edu/; Northern Illinois University (n.d.). *Huskie Commons Institutional Repository*. https://commons.lib.niu.edu/

implementing the findings), and recommendations on protecting students' privacy. Generic versions of the assessment tools will be publicly available through the toolkit to any academic library that wants to utilize the tools to better understand and support their students' learning. Additionally, the deidentified data will be made available for analysis and comparison, with other datasets using the assessment tools. Recordings of the invited workshops will also be available through the toolkit.

Implications: Research findings will expand the existing knowledge of the current literature on factors impacting students' academic success related to the academic library. This study considers not only academic success as measured by GPA, but also academic success from the perspective of students. Both UIC and NIU will make recommendations at their respective academic libraries regarding library usage that contribute to academic success, and deficits in library use that may hinder academic success. The libraries will also share additional factors with units of outside of the library related to student academic success. Both libraries and external units can develop programs that enhance students' learning based on the research findings.

Diversity Plan:

A diversity of perspectives and practices in the project will be accomplished through multiple aspects. First, the project team is comprised of individuals with diverse roles and experiences in the library. In addition, we will invite content experts who are knowledgeable in psychological constructs, and other librarians and practitioners to provide input on the assessment tools, all of whom will bring their diverse perspectives into this project. Additionally, validating the assessment tools that are commonly used by other disciplines will advance the knowledge to the library and information science field. Interdisciplinary practices will strengthen this project and benefit to academic library community.

With this project, our goal is to better understand all of our students and how their academic engagement, including their library use may relate to their academic success. To accomplish our project goal, our performance locations are from universities with diverse populations that also serve underrepresented minorities[20,21]. The research team will invite all UIC and NIU undergraduate students to take our online Student Success Survey, and we will be exploring the data through a variety of student demographics, to better understand what academic engagement best supports students from diverse groups. For the online journaling tool, our goal will also be to have a diverse representation of students participate. Thus, our recruitment efforts are intended to result in the inclusion of diverse students from both institutions, which is critical to deeper understanding their needs, and research findings and assessment tools that can be applicable to other academic libraries who serve those populations. This project acknowledges that utilizing standardized student success measures (e.g., GPA) may limit an understanding of diverse students and thus our aims are to broaden and deepen our understanding of undergraduate students' needs from diverse programs (health sciences; humanities; engineering; life sciences; social sciences), and financial background. All the efforts described above will strengthen the fields' commitment to diversity, equity, and inclusion practices.

Project Results

Outcomes of this project will be reports, publications, publicly available revised and validated assessment tools, deidentified data shared for re-use, and the Student Success Assessment Toolkit. (See Figure 2).

The first outcome of this project is to understand what factors, including psychological behaviors (self-regulation and motivation), impact students' academic engagement activities and to reveal students' own definitions of academic success from diverse student perspectives. The findings of this project will provide a greater understanding of students' behaviors, and academic goals, and contribute to the advancement of knowledge from previous studies. Furthermore, the list of students' own definition of academic success can be used as outcomes to better measure the impact of students' academic engagement on their academic success, rather than standardized outcomes such as GPA. At the end of this project, the research team will compare the findings from both institutions for generalizability.

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[20] University of Illinois Chicago (2021, September 8). *UIC sets enrollment record for the 7th year in a row*. UIC Today. https://today.uic.edu/uic-sets-enrollment-record-for-the-7th-year-in-a-row

[21] Northern Illinois University. (2021, October 4). *New policies help bring diversity to incoming class*. NIU Today. https://niutoday.info/2021/10/04/new-policies-help-bring-diversity-to-incoming-class/

Another primary outcome of this project is to generate assessment tools (student success survey instrument and an online journal form), validated by content experts, for other academic libraries who may want to replicate the study or examine their students' population. The Student Success Assessment Toolkit will provide guidance on how to use assessment tools. Given that this project targets the academic engagement and psychological behaviors of diverse undergraduate students, the assessment tools will be applicable for academic libraries who serve diverse student bodies including both non-traditional students (e.g., first generation) and underrepresented minorities. Additionally, while both universities are geographically in Illinois, UIC is an urban public research university whereas NIU is in a suburban setting. Having institutions in two different density settings (urban vs. suburban) along with diverse respondents will allow the comparison of responses in different settings. This will provide insights as to how to adopt the assessment tools at other institutions. The assessment tools will encompass a comprehensive list of students' own definition of academic success generated from the research findings, and allows other academic libraries to capture additional students' definition of academic success by offering an open-ended response field. We will encourage other academic libraries to report their findings, particularly related to students' definition of academic success to us. We will share additional findings on the website and modify the assessment tools as needed related to findings, and to accommodate new services. The tools will be made available for dissemination to academic libraries who may not have capacity or policies to utilize learning analytics, or for academic libraries who wish to supplement or replace their use of learning analytics, with a method to assess the impact of their library on student.

Figure 2. Summary of the Two-year Period Project Activities and Outcomes
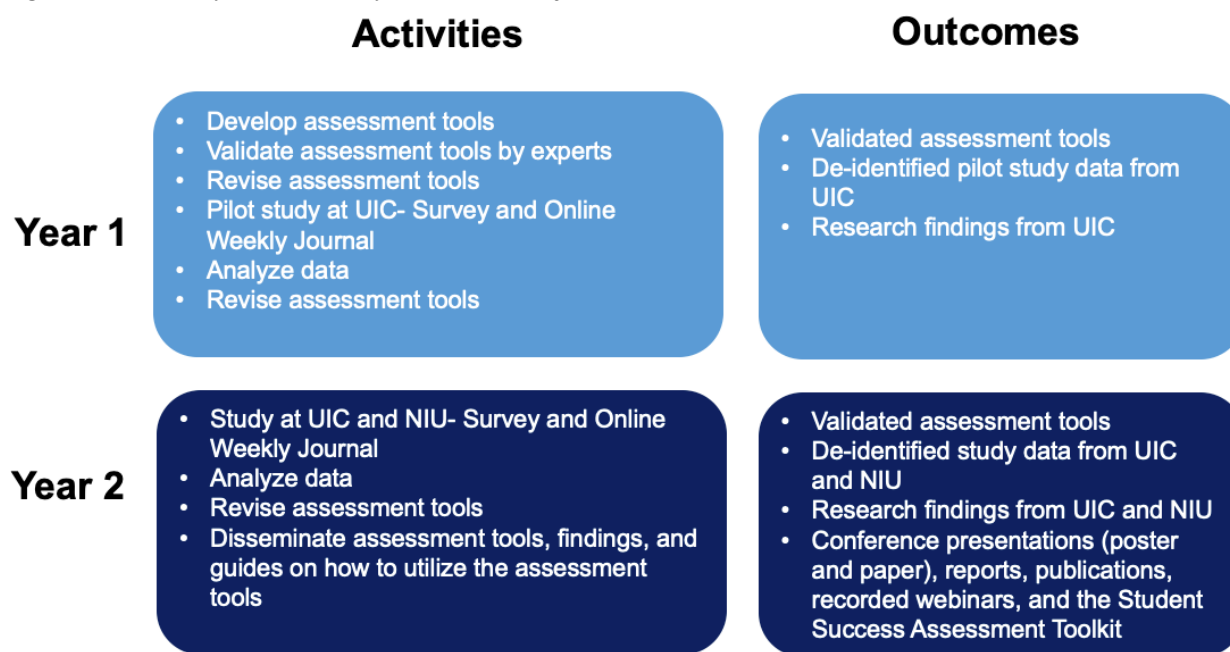
The results of this project will inform Academic libraries on the library resources and services that impact student success. These can be used to more effectively market library resources and services and customize their workshops, consults, and instruction to meet the diverse needs of various students. Additionally, the academic libraries can share the findings with their institution and collaborate with them to develop programming to serve all types of students' learning. Employing the validated assessment tools will empower academic libraries to embrace their role as a contributor to student success, lead discussions, and contribute to provide programming to support all types of students' learning.

Budget Summary:

The IMLS request of $257,656 includes indirect costs of $90,539 and direct costs of $167,117 over two years. Salaries and fringe for PD/Co-PIs: $90,390 and student salary and fringe: $23,255. For more information on how each cost was allocated, please refer to Budget Justification.

Developing and testing assessment tools for measuring library impact on student academic success

Schedule of Completion-Year One

Year One: Develop assessment tools and test them at the host institution

Activity	August 2022	September 2022	October 2022	November 2022	December 2022	January 2023	February 2023	March 2023	April 2023	May 2023	June 2023	July 2023
Develop assessment tools	▓	▓	▓									
Recruit content experts			▓									
Create a criteria/ evaluation form to be used by content experts			▓									
Have content experts validate the assessment tools				▓								
Revise the assessment tools based on the feedback from content experts				▓	▓							
Prepare for IRB materials and obtain IRB approval				▓	▓							
Hire a graduate student worker to recruit students for the online weekly journals and monitor completion of the assessment tools					▓							
Distribute the survey to UIC all undergraduate students						▓						
Analyze the survey data						▓	▓					
Send a recruitment survey for Online Weekly Journal Participants							▓					
Screen and select Online Weekly Journal participants							▓					
Begin Online Weekly Journaling							▓	▓	▓			
Send reminder email to the Online Weekly Journaling participants and monitor the progress							▓	▓	▓			
Analyze the Online Weekly Journaling										▓		
Review the assessment tools and revise them											▓	
Write the report											▓	▓
Create the Student Assessment Toolkit website											▓	▓

Developing and testing assessment tools for measuring library impact on student academic success

Schedule of Completion-Year Two

Year Two: Test the revised assessment tools at both institutions and disseminate the data and assessment tools												
Activity	August 2023	September 2023	October 2023	November 2023	December 2023	January 2024	February 2024	March 2024	April 2024	May 2024	June 2024	July 2024
Prepare for IRB materials and obtain IRB approval	▓	▓										
Project planning meeting for research team		▓										
Distribute the survey to UIC and NIU			▓									
Analyze the survey data				▓	▓							
Send a recruitment survey for Online Weekly Journal Participants UIC and NIU					▓							
Screen and select Online Weekly Journal participants					▓							
Begin Online Weekly Journaling						▓	▓	▓				
Send reminder email to the Online Weekly Journaling participants and monitor the progress						▓	▓	▓				
Analyze the Online Weekly Journaling								▓	▓			
Review the assessment tools and revise them								▓	▓			
Write the report								▓	▓	▓		
De-identify data and deposit them in UIC repository										▓		
Develop and maintain the Student Assessment Toolkit website									▓	▓	▓	▓
Draft scholarly article and submit proposals for conferences				▓	▓	▓	▓	▓	▓			
Plan and schedule series of webinar for disseminating the assessment tools						▓	▓	▓	▓	▓		
Prepare and disseminate the data and assessment tools via various channels (e.g., social media)						▓	▓	▓	▓	▓	▓	▓
Host series of Webinar for disseminating the assessment tools											▓	▓
Provide workshops when invited by other academic libraries											▓	▓

Digital Products Plan

Type: What digital products will you create?

Digital products that will be created by the research project team include the assessment tools (Academic Engagement and Student Success Survey, recruitment survey, and Online weekly Journal), pre-analysis (raw) and post-analysis (deidentified) data sets (collected from the Academic Engagement and Student Success Survey and Online weekly Journal), and instructional videos on use of the assessment tools (how to recruit participants, disseminate the assessment tools, and analyze results). Additional digital products that will be created include recorded workshops, conference posters, and publications. In addition, a Student Success Assessment Toolkit website will also be created to facilitate access to the digital products. The digital products will be in the following digital file formats: PDFs, DOC, TXT, XLSX, CSV, MP4, TIFF, and HTML.

Availability: How will you make your digital products openly available (as appropriate)?

Digital products will be disseminated through various channels. Most of the digital products indicated above (assessment tools, the Student Success Assessment Toolkit, webinars, instructional videos, post prints of publications, data sets) will be deposited in UIC's institutional repository, INDIGO[1], the open access institutional repository of the UIC: https://indigo.uic.edu and in NIU's institutional repository, Huskie Commons[2], the open access institutional repository of NIU: https://commons.lib.niu.edu. INDIGO and Huskie Commons will provide unrestricted free access to the digital products. A Student Assessment Toolkit website will be developed using a content management system product. The website will not directly contain data products. Instead, it will be used to organize, and promote the work of this project, and provide links to the digital products. Deidentified datasets with limited demographic information to prevent re-identification (class, area of study) will also be made available in UIC's INDIGO repository and in NIU's Huskie Commons repository, and linked through the assessment toolkit website. The limited data sets will be accompanied by README files and appropriate codebooks or data dictionaries, to describe the data so that the data sets are reusable. Data will be shared in aggregate when it is not possible to anonymize the data through deidentification.

Access: What rights will you assert over your digital products, and what limitations, if any, will you place on their use? Will your products implicate privacy concerns or cultural sensitivities, and if so, how will you address them?

All digital products developed through this project that can be shared without concern for data privacy, will be publicly available without any access restrictions through the institutional repositories of the UIC and NIU. Their reuse will be governed by a CC BY NC 4.0 license that will be noted on developed materials. Shared datasets will also include a data reuse statement, requesting a full citation including the DOI be included with any reuse of the data. This will allow researchers to track any data re-use. Any identifiable information from the collected

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[1] University of Illinois at Chicago research repository INDIGO. https://indigo.uic.edu
[2] Northern Illinois University repository Huskie Commons. https://commons.lib.niu.edu

datasets (Academic Engagement and Student Success Survey and Online Weekly Journal) will be removed through data anonymization, so the information cannot link back to individuals. When possible, journal publications will be copyrighted by the authors or assigned a CC BY NC-SA license. Post-prints of publications will be made available through INDIGO and Huskie Commons with a CC BY NC 4.0 license. Pre-analysis data will be retained by the research team for further analysis. As it will not be anonymized or further deidentified, access will be restricted to only the research team through to a 2-factor login authentication Box account.

Sustainability: How will you address the sustainability of your digital products?

Materials uploaded into the repository will be uploaded in standard file formats (TXT, PDF. CSV, MP4) to allow long term accessibility and sustainability of the formats. The institutional repository where information will be stored and the website that will host the assessment tool kit will provide documentation and access to the material long-term. The comprehensive documentation will allow for long-term use and application of the developed assessment tools. The University of Illinois Chicago has committed long term to having a repository and content management system. Northern Illinois University has committed long term to having a repository. Data will be migrated should the platforms hosting these services change (although that is not anticipated).

Data management Plan

All data to be used in this research project will be obtained from the participants at UIC (year one) and UIC and NIU (year two) through the Academic Engagement and Student Success Survey and the Online Weekly Journal. Only deidentified/ anonymized data will be deposited in either the UIC or NIU repositories, which will result in the data being publicly available. Pre-analysis data will be stored in UIC's 2-factor authentication Box account, which is a cloud based secure content management system. Any personal contact information that was obtained for compensations will also be stored in UIC's Box account, and will be destroyed once compensation has been distributed to participants.

Types of data:
- Pre-analysis data from Academic Engagement and Student Success Survey and Online Weekly Journal
- Survey Instruments (Assessment tools - Academic Engagement and Student Success Survey and Online Weekly Journal)
- Post analysis (deidentified) data for sharing
- Data dictionary, codebooks and README files for data reuse
  Additional digital products created from project including recorded workshops, conference posters, publications.

Format of Dataset and data sharing:
Pre-analysis data

The pre-analysis (raw) data will be collected using Qualtrics, an online survey instrument. Only the PD and co-PIs will have access to this data.

The Academic Engagement and Student Success Survey will not collect direct or indirect identifiers. Once the survey closes, the data will be downloaded from Qualtrics and uploaded into a UIC Box cloud system account in both Excel (.xlsx) and SPSS (.sav) formats. The data in Qualtrics will be deleted. Only the PD and co-PIs will have access to this data.

The Online Weekly Journal will use an unique ID assigned to each participant, so that participant responses from each week and their demographic information can be combined into one data set once data collection is complete. After the data collection is complete, data will be downloaded from Qualtrics in Excel (.xlsx) format and compiled into one data set. The non-direct identifiers will be anonymized, and the connecting identifiers destroyed, so the information cannot be linked back to the individuals. The downloaded data will be deleted in Qualtrics and stored in UIC Box in both Excel (xlsx) and SPSS (.sav) formats. Only the PD and co-PIs will have access to the data in the UIC Box account.

Although the non-direct identifiers will be removed from the Online Weekly Journal data, and the student success survey will not prompt for direct or indirect identifiable information, there is the potential to re-identify subjects using demographic information. For this reason, the pre-analysis data access will be restricted to and only reused by the project team. The project team will maintain this data indefinitely in UIC's Box account, which requires 2-factor authentication.

Any personal contact information that obtained for compensations will be stored in UIC Box and will be accessible to the project team. After compensation is provided, contact information will be destroyed.

Post-analysis data

The post-analysis (deidentified) data will be saved in CSV format and shared through UIC's institutional repository (INDIGO[1]) and NIU's institutional repository (Huskie Commons[2]). Data dictionaries, codebooks, and README files will be created and made available with the shared data to facilitate data reuse. The shared data sets will have limited demographics to prevent re-identification. The Online Weekly Journal data will include discipline as the demographic values. The Student Success survey data will include first generation status, Pell eligible status, and discipline as the demographic values. As the demographic data could provide the potential for re-identification, demographics will not be provided if the number of respondents in a combination of the demographic categories is 3 or less.

Assessment tools

The assessment tools will be shared in INDIGO and Huskie Commons in PDF, DOCX, and QSF file formats. (The QSF file format is a format of Qualtrics surveys and will allow the transfer of a survey copy from one account to another.)

Publications, Conference posters and Recorded Workshops

Byproducts of the project including publications and conference posters will also be uploaded in INDIGO in PDF format. Survey documentation (PDF format) and recorded workshops (MP4 format) that will provide support and instructions on how to distribute the surveys and collect and analyze the data will also be uploaded into UIC's institutional repository INDIGO and NIU's institutional repository Huskie Commons.

Data sharing agreement

The data will be uploaded into UIC's institutional repository INDIGO and assigned a CC BY NC 4.0 license. Although this license requires attribution, an additional data use agreement will be added to the data record, requiring the use of a citation along with the DOI when reusing the data. This data will also be uploaded into NIU's institutional repository Huskie Commons and assigned a CC BY NC 4.0 license.

Data repository/sharing/archiving

A long-term data sharing and preservation plan will be used to store and make publicly accessible the data beyond the life of the project. The data will be deposited into UIC's institutional repository INDIGO. The UIC University Library has provided INDIGO to the UIC community as an open access platform for dissemination and archiving of UIC scholarly output, including de-identified research data. In accordance with UIC's repository policy, the de-identified data will be accompanied by the appropriate documentation, metadata, and code, to facilitate reuse of data by any potential researchers, including academic librarians.

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[1] University of Illinois at Chicago research repository INDIGO. https://indigo.uic.edu
[2] Northern Illinois University repository Huskie Commons. https://commons.lib.niu.edu

Organizational Profile

The University of Illinois Chicago (UIC) is one of three universities in the University of Illinois System. Each university has a chancellor/vice-president reporting to the president; the University of Illinois Board of Trustees is the governing body for the system. UIC, the largest public research university in Chicago, is an R1 (doctoral university, very high research level) and has 14 degree-granting colleges including all of the health sciences and law.

The mission of the UIC University Library is to "Empower the UIC community to discover, use and create knowledge[1]." Library leadership approved this statement in September 2018, as well as the vision of "a world of equal access to information and resources where everyone is inspired to achieve their goals." These aspirations are in alignment with UIC's mission[2]:

- To create knowledge that transforms our views of the world and, through sharing and application, transforms the world.
- To provide a wide range of students with the educational opportunity only a leading research university can offer.
- To address the challenges and opportunities facing not only Chicago but all Great Cities of the 21st century, as expressed by our Great Cities Commitment.
- To foster scholarship and practices that reflect and respond to the increasing diversity of the U.S. in a rapidly globalizing world.
- To train professionals in a wide range of public service disciplines, serving Illinois as the principal educator of health science professionals and as a major healthcare provider to underserved communities.

The UIC Library provides students, faculty and staff with the information they need for learning, discovery, clinical practice and community engagement by acquiring, organizing and archiving information; by providing expert assistance in accessing and applying information; and by sustaining excellence physical and virtual environments. The Library serves an urban campus of 34,199 students (fall 2021 enrollment) and 9,291 faculty and staff, as well as the Chicago metropolitan area and the State of Illinois. UIC's student body of approximately 65 percent undergraduate and 35 percent graduate and professional students is recognized as one of the most diverse in the country: there is no ethnic majority. More than a third of UIC students speak English as a second language, and 38% are first-generation college students. The University Library acknowledges the varying needs of its diverse user base and is a user-centered library that seeks creative ways to enable members of its community to achieve success.

The UIC University Library consists of the Richard J. Daley Library (humanities, social sciences, life sciences and engineering) and health sciences libraries in Chicago, Peoria and Rockford. The department that will lead this project is Assessment and Scholarly Communication. The department provides these services to the campus: information and instruction on copyrights, digital scholarship, data management, data curation, data mining, data visualization, measuring scholarly impact and open educational resource initiatives. In addition, the department manages the institutional repository, the library's journal publishing program, additional digital publishing tools, a digital scholarship lab that serves all academic disciplines and the UIC university-wide research information system MyActivities. It oversees the library's centralized data repository and dashboard. The department is also responsible for library assessment including the design, distribution and analysis of internal and external surveys and other assessment tools that discover the value and impact of the University Library on student and faculty success.

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[1] https://library.uic.edu/about/strategic-plan/
[2] https://www.uic.edu/about/